



## BAKER COLLEGE STUDENT LEARNING OUTCOMES

### PHY 3210 Principles of Astronomy 3 Semester Hours

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#### Student Learning Outcomes & Enabling Objectives

1. Compare and contrast the early views of the universe; from ancient times through the Renaissance to modern views of the universe.
  - a. Compare the geocentric and heliocentric models of the solar system.
  - b. Identify how ancient people made observations of the universe.
  - c. Evaluate how telescopes, manned and unmanned space exploration, and spectroscopy enable the study of the universe.
2. Differentiate between the types of objects in the solar system.
  - a. Differentiate among the terrestrial planets, jovian planets, and the minor planets.
  - b. Describe characteristics of each of the major planets.
  - c. Identify the composition, size, motion, and major features of each of the 8 major planets.
  - d. Describe the physical properties of the different objects within the solar system.
  - e. Compare and contrast the composition, structure, and motion of the Earth and Moon.
  - f. Describe the characteristics of and differentiate between asteroids, meteoroids, and comets.
  - g. Describe the structure and composition of the Sun.
3. Explain exotic space phenomenon.
  - a. Discuss the characteristics of black holes, how they are formed, and how they are predicted by general relativity.
  - b. Explain pulsars, gamma ray bursts, and neutron stars.
4. Analyze the theory of star evolution and classification.
  - a. Describe the categories of stars.
  - b. Explain spectral classifications.
  - c. Describe how Hertzsprung-Russell (H-R) diagrams help to categorize stars.
  - d. Explain the formation and life cycle of stars.
  - e. Describe the types of stellar explosions and their causes.
  - f. Explain where elements are formed in stellar explosions.
5. Identify the categories of galaxies.
  - a. Categorize galaxies by shape and composition.
  - b. Describe the properties of the Milky Way, our galaxy.
  - c. Discuss how we came to understand that the Milky Way is a galaxy and its structure.
6. Explain current theories of the universe.
  - a. Explain the Big Bang Theory as the leading theory in the birth of the universe.
  - b. Explain when and where the Big Bang occurred.
  - c. Describe the expansion and shape of the universe.
  - d. Describe the characteristics of the early universe.
  - e. Summarize the horizon and flatness problems.

- f. Describe the formation of the large-scale structures of the universe.
- 7. Describe and explain some laws of physics that determine properties of the universe.
  - a. Kepler's Laws.
  - b. Newton's Laws.
  - c. Doppler shift.
  - d. Tidal force and the Roche Limit.
  - e. Electromagnetic waves.
- 8. Explain exoplanets
  - a. Describe how exoplanets are discovered.
  - b. Describe the properties and classifications of exoplanets.
- 9. Describe interstellar dust.
  - a. Identify the types of interstellar matter.
  - b. Explain emission nebulae.

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These SLOs are/are not approved for experiential credit.

**Effective: Fall 2017**